62-90174-50

March 4, 1956

# This Week MAGAZINE

The Sunday Star
WASHINGTON, D. C.

"IT'S LOVE! Richard Eyer and Samantha. See Page 15

## The Race For The "World Bomb"... Page 8

WORDS TO LIVE BY

MARCH 4, 1956

# A Good Day To Start Again

By ROBB SAGENDORPH, *Publisher, "The Old Farmer's Almanac"*

To this working almanac-maker, the 24-hour turning of the earth on its axis which we call day, holds special fascination. For each day seems to carry with it a likeness to the wisdom which has appeared in this same day for hundreds of years.

Take March 4 as an example. I always think of it as a day of Beginnings. On this former Inauguration Day the Presidents used to take the oath of office; Abraham Lincoln did so in 1861, Theodore Roosevelt in 1905. Through the ages, the time has been meant for beginnings. First the Egyptians, then the Greeks and Romans, marked it as the New Year. It is the season when Mother Earth once more begins to bear. Creation stirs within us as inevitably as in the wild jungle fowl whose brood always hatches at the equinox, or the maple tree whose sap is said to pulsate skyward more vigorously with the waxing of this moon.

From our snug push-button cars and air-conditioned factories it is perhaps difficult for us to notice these first evidences of primeval creation. We shall probably even guffaw at the solemn pronouncements that spring is on the way and will be with us again this year on the 20th at precisely 10:21 a.m. Spring indeed! It is unlikely we shall even speak of spring when these pitiless March winds carry a man's new hat to mud and slush. Yet there seems to be a connection between this miserable weather and mankind's progress.

I say this because I believe that the weather too is part of God's great creative plan for the Universe, a plan with forces perhaps little understood but plain to all who would read them. Rugged March brings life itself peeping from primordial slime. Through last winter's rotting leaves the sharp spears of the crocus and daffodil come to mount anew their emblems of smiling beauty. Birds take wing from other lands to join us in the poetry of the season. Only to be alive in March is to be born again.

One final note: the calendar shows that Sunday, as the Lord's Day, was first legally established sixteen hundred and thirty-five years ago, by the Emperor Constantine. So this Sunday, March 4, 1956, is marked in my book of records as an extra-good day for beginnings. It is a day for the shedding of mean, despondent thinking; a day for the giving and receiving of love, Creation's one real meaning.

FPG

**SPRING AGAIN: "Through the ages, the time has been meant for beginnings. . . It is the season when Mother Earth begins to bear"**

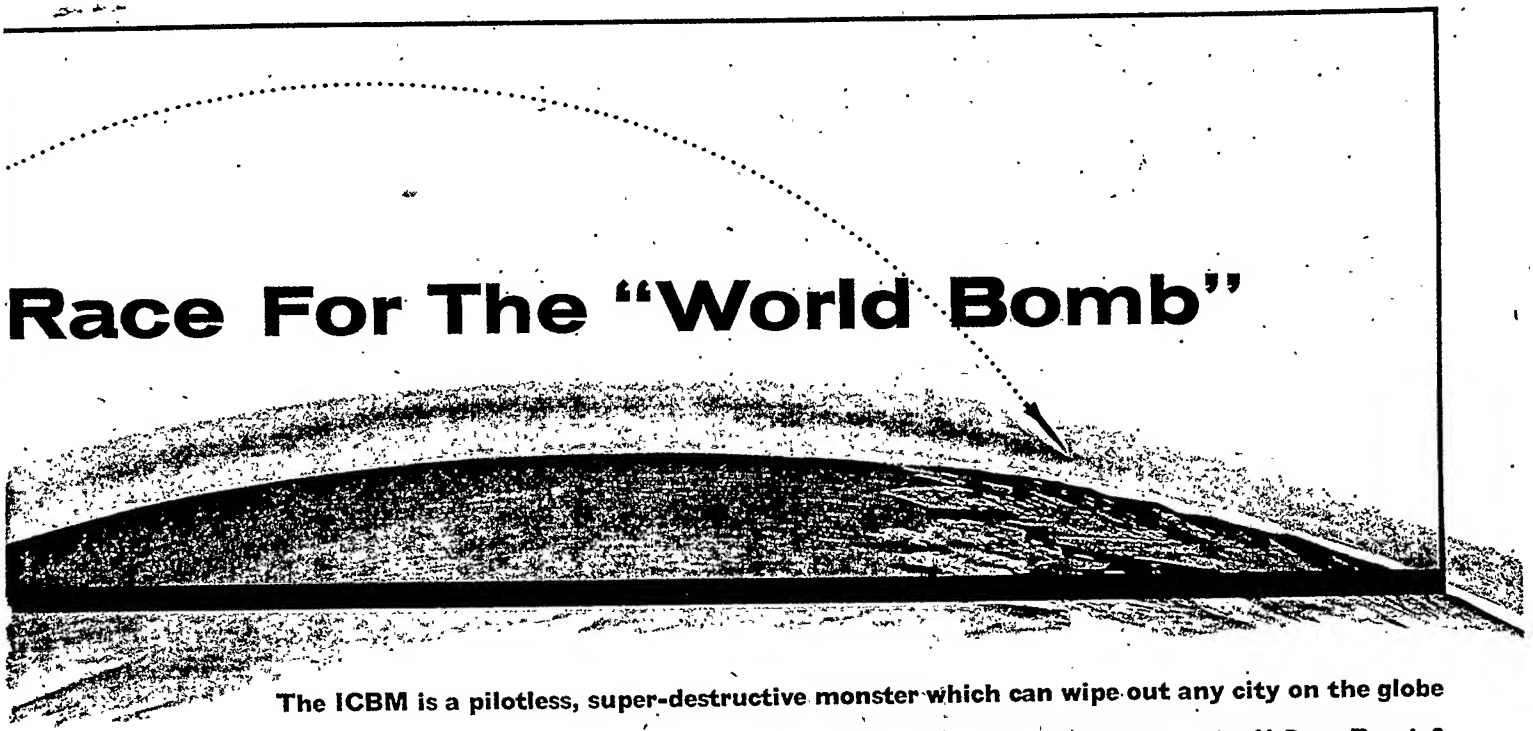

**March 4, 1956**
Cover by Don Ornitz

**This Week** THE SUNDAY MAGAZINE
*United Newspapers Magazine Corporation*
420 Lexington Avenue, New York 17, N. Y.

WILLIAM I. NICHOLS, *Editor-in-Chief and Publisher*
STEWART BEACH, *Executive Editor*

EUCLID M. COVINGTON, *President* • JOHN C. STERLING, *Chairman of the Board*

# Race For The "World Bomb"



**The ICBM is a pilotless, super-destructive monster which can wipe out any city on the globe and cannot be intercepted. Who will have it first — the U.S. or Russia?**

unds of security, an authentic report on the status of our top-secret ICBM project. "Atlas" has been its code name.

If present plans are adhered to, the ICBM will be between 75 and 100 feet long, approximately 15 feet in diameter, and will be powered by two huge rocket-jet engines. Experts say it will be capable of speeds of 12,000 to 15,000 miles an hour.

### Payload: 200 A-Bombs

In this connection, the National Advisory Committee for Aeronautics reports that experimental NACA missiles have already flown at more than 7,000 miles an hour!

That is close to twice as fast as any speed ever before attained by a man-made object.

It is anticipated that the ICBM will have a range of 5,000 to 6,000 miles and will be able to achieve altitudes of over 246 miles. It will have an elaborate built-in guidance system, and current designs call for this system to be so accurate that the missile will be able to come down out of the ectosphere and hit within the confines of any given city.

The demolitionary power the ICBM will carry is hellish. Each will have inside it the explosive force of 200 A-bombs.

Is it any wonder that a veteran Pentagon strategist remarked to me, "The ICBM is as near to being the ultimate weapon as anyone now alive is ever likely to see"?

The weapon is so devastating that, it can be disclosed, the long-range war plans of the NATO powers have had to be completely revised. In fact, some of the shrewdest NATO thinkers are maintaining that the next world war can be settled by ICBM's within a half-hour after it starts.

**YAKOVLEV: Out to win for Russia**

Which leads us to the question: Where does the Soviet Union stand with the intercontinental ballistic missile? If it gets one first, the U.S. and the rest of the free world will be at the Communists' mercy.

Alarming though it sounds, I must report that the Russians have also been making big strides with an ICBM. Air Secretary Quarles said, "You can assume that the Russians have been recording significant progress with the ICBM. We have every cause to be concerned."

The Russians started working on an ICBM in 1946, I was informed. Early that year, they carried off more than 200 German rocket experts to the U.S.S.R., locked them in a newly constructed laboratory at Moscow-Chimki, and ordered them to design a guided missile with a transatlantic range.

The program moved quickly. And for good reason. One of the German scientists, a genius at physics by the name of Helmut Grottrup, had previously done vast research along exactly the same lines for Hitler.

Actually the U.S. Army got to Grottrup first, but no one realized the German scientist's importance. Through a shocking slip-up, G-2 turned him loose and let the Russians grab him. We may yet pay heavily for that blunder.

### America's Head Start

Year by year, the Russians have increased the tempo of their ICBM efforts. Not long ago, they even took their top plane designer, A. S. Yakovlev, creator of the famous Yak fighter-bomber, off all his other activities and assigned him exclusively to the ICBM.

Nevertheless, as of now, the U.S. seems to be out front in the crucial race.

Air Secretary Quarles, the most knowledgeable man in America on this subject, told me:

"On the basis of facts at my disposal, I feel confident that we are ahead of the Russians in the evolution of an intercontinental ballistic missile suitable for our purposes."

Luckily, the United States recognized the value of guided missiles even before the Russians did. Alone among the Allied powers, we produced guided missiles for combat purposes during World War II. This has never before been disclosed.

What's more, unlike the Russians, the U.S. Air Force didn't wait for the end of World War II to begin work on the intercontinental missile itself. Although it knew that this might well be a 50-year task, it set up a special committee of some of its most gifted officers to delve into the problem in January, 1945, while hostilities against Germany were still on.

"We knew how vital it was for us to get an ICBM before the Russians did," Brigadier General J. F. Phillips (Ret.), who served on that committee, declares.

It is true that all missile work for the Armed Forces languished between 1946 and 1950. That was the period when the United States was cutting back on most of its military defenses. However, after the outbreak of the Korean War, missile work picked up, and it has been in high gear ever since. Our expenditures for guided missiles have multiplied 25-fold since 1950. Today, the three services are spending more than $1,000,000,000 a year on missiles. How much of this is going just for ICBM cannot, of course, be divulged. That is strictly classified — but it's a lot. Insiders say that each individual ICBM will cost between $4,000,000 and $5,000,000.

**"MR. MISSILE": He's General Putt**

By order of the Joint Chiefs of Staff, the ICBM now has priority over practically every other research and development project in the Armed Forces. The best brains in science, industry and the Air Force have been marshaled for it under the personal leadership of Air Secretary Quarles.

The basic research for the missile is being done in three ultra-secret NACA laboratories: at Wallops Island, Va.; in Cleveland; and at Moffet Field, Calif. Here, brand-new metallic materials are being evolved, engines that employ hitherto unheard-of principles of propulsion tried out, and missiles with fantastic, futuristic shapes tested.

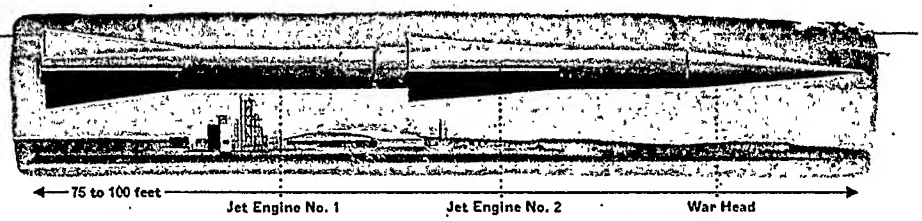
Meanwhile, in the Pentagon and at the Air Research and Development Command in Baltimore, crack Air Force planners headed by Lieutenant General Donald L. Putt, Deputy Chief of Staff for Development, better known as "Mr. Missile," are busy determining immediate applications for the NACA's broad-scoped discoveries.

Development of the actual parts for the pilot model is being done by American industry, and nothing is being allowed to stand in the way of a fast job. A big Southern California aircraft company found that out. This company held

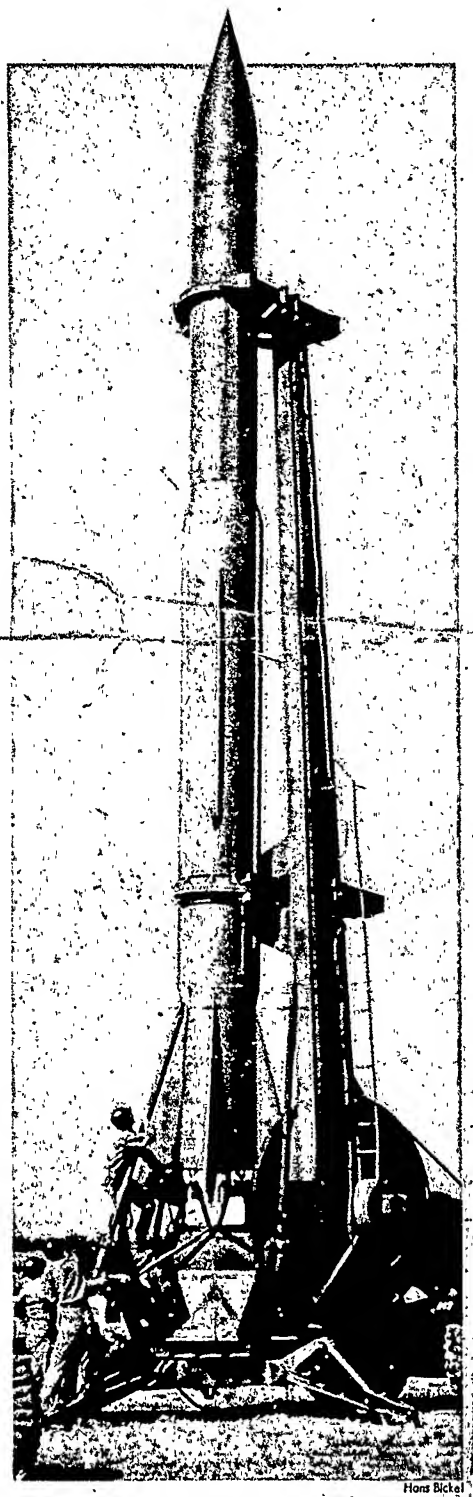
—— *Continued on next page*

*Continued from preceding page*

# ICBM On Its Way: Hell At 15,000 Miles An Hour




**POWER PLANT: No. 1 jet engine will hurl ICBM 100 miles up, then drop off as No. 2 takes over. Twelve minutes after launching, missile is on its own for thousands of miles to target**



Hans Bickel

**CORPORAL, ready for action now, hits 5,000 mph**

the prime contract for producing the ICBM but didn't move speedily enough for the Air Force.

"Either you get better results or you lose the contract," the Air Force warned. The company didn't improve and the Air Force revoked its contract.

"The ICBM means too much to the security of the United States for us to take chances," it ruled.

The Ramo-Wooldridge Corporation of Los Angeles now has the over-all contract for producing the ICBM. The General Electric Corporation has responsibility for the electronic components, North American Aviation and Aerojet-General are working on the rocket engines, and the Convair Division of the General Dynamics Corporation is building the hull and tanks. These five companies hold in their hands the lives of all their fellow-countrymen. And their job is the toughest proposition American airmen, scientists and industrialists have ever had to tackle together.

Three Gargantuan problems have had to be met in developing the ICBM. The first is the question of propulsion. How do you fly a 250-ton vehicle for 6,000 non-stop miles at a speed of 15,000 miles an hour without one refueling? It sounds almost impossible, but real gains have been made toward this goal.

The system that has been worked out is this. Two mighty jet engines are being designed with a combined thrust of over 600,000 pounds, 30 times greater than the strongest airplane engine in the world today. One of these engines will fling the missile the first 100 miles or so up into the air. Then, its fuel exhausted, it will automatically drop off and lighten the load. The second engine will now take over. By the time it, too, has exhausted its fuel — 10 to 12 minutes after the launching — the ICBM will have built up such enormous momentum that it will be able to flash through the ectosphere right to the target with no further propulsive power, like a bullet from a gun.

Naturally, the most powerful fuel imaginable will be required to run the ICBM's two giant engines. Just what it will be is not yet decided. Best bet now appears to be liquid oxygen plus a new secret chemical.

## Terrific Speed, Terrific Heat

Second of the three mammoth problems the ICBM designers have to face is heat. When the ICBM dives back into the earth's atmosphere at the end of its 15,000-mile-per-hour flight through space, the terrific speed at which it will be traveling is going to generate absolutely unbearable temperatures, above 10,000 degrees Fahrenheit. That is hotter than it is on the sun. It is so hot that any diamond exposed to it would immediately turn into a puff of vapor.

"Under such heat," NACA officials say, "the ICBM could just disappear."

The ICBM men think that they may have found an answer to this awful heat, though. They believe it may lie in an entirely new kind of material with which they have been experimenting. It is called "cermets," an alloy of metal and ceramics.

Just recently, a certain cermet was tested at more than 6,600 degrees. It survived.

The last of the three big problems in building the ICBM is even more rugged than the others. It involves a guidance system for the missile. The question here is:

"How do you launch a missile in the United States and expect it to find its way, with no man's help, for 6,000 miles through outer space to a little dot on the surface of the earth?"

Not the slightest margin for error can be tolerated. Air Secretary Quarles has stressed that in a 6,000-mile flight a mere one-per-cent error (such as Hitler allowed his V-2's) could cause the ICBM to hit 60 miles away from Point Zero.

Making the situation still more difficult is that, in all likelihood, the ICBM will have to set practically its entire course during the first 200 miles of its flight. Once it gets up into the ectosphere, it probably won't be able to do any steering whatsoever. Its rudders won't have any "air" to lean against up there.

There have been days when the ICBM experts were in black despair over this guidance problem.

"We thought it was just beyond man's capacity to solve," one ICBM man told me.

It can now be reported, though, that the dark mood has passed. ICBM men are optimistic that they will soon have the matter licked.

## Navigator: An Electronic Brain

The latest thinking provides for the ICBM to be a celestial-navigation missile. It will set itself on the correct ectospheric path by means of automatic tracking telescopes which will "shoot" the stars and transmit the data to an electronic "brain" capable of instantly figuring out the most intricate mathematical equations. This "brain" will determine the right course and see to it that the ICBM follows it.

Just lately whispers have been heard that the ICBM may also carry some singular infrared instruments to guide it down from the ectosphere, at the end of its flight, directly into the center of its target. These instruments are said to be so sensitive that they can distinguish between a city and the suburbs around it at an altitude of 100 miles. They do it through variations in heat.

Is there any possible defense against the ICBM, assuming that Communist Russia gets one, too?

Most authorities think not! They say it moves too incredibly fast for anyone ever to ward off its blow.

"Can you imagine intercepting it?" Harold E. Talbott, the former Secretary of the Air Force, dejectedly said. "Two of us might just as well stand at opposite ends of a dark hall and pitch needles at each other in the fond expectation that the needles might collide."

If we can't invent a way to intercept them, the only recourse the United States will have against a Russian ICBM is to try to knock out its launching sites.

We can use our own ICBM's to do this or the revolutionary atomic-powered planes which the Air Force has under development. These atomic planes will be able to fly for a week without refueling. They can be kept permanently aloft, ready for instant action in case of war.

"With their long cruisability," Secretary Quarles says, "they can utilize the air virtually as a parking strip."

Quarles believes, incidentally, that there will still be a big place for the manned plane in the Air Force even after it has the ICBM.

"The ICBM is just one way to blow up a city, not the only way," he declares. "In general a manned plane can do a better job than a missile. A live pilot can select an alternate target that preliminary intelligence didn't disclose. With a manned plane, human intelligence is merely six miles from the target, not six thousand."

That the ICBM can deal out atomic death faster than any other weapon, Secretary Quarles doesn't dispute, though. Like every conscientious Air Force officer, he hates the very thought of it. His one dream is that the horror incarnate in the ICBM may actually prove a boon by deterring any potential aggressor from starting a war which could set the ICBM's whizzing.

"Even the Russians must realize," he says, "that we only have one world to destroy." —The End

This Week
MAGAZINE

# Do Women Make Good Bosses?

**With more lady executives than ever before, it's becoming a hot question. Here THIS WEEK reports the surprising answer**

**By LESTER and IRENE DAVID**

There is a remarkable trend in business and industry these days, and chances are excellent you will come face to face with it sooner or later. That is, unless you have already. It's the spectacular rise of the lady boss.

Few persons realize how far she has advanced and in what impressive numbers. In its most recent tabulation, the U.S. Census Bureau reveals that the number of women executives has now passed the one million mark. This is a 150-per-cent jump in the past 15 years and all the more astonishing in view of the fact that the number of male bosses increased only 65 per cent in the same period.

Wait till you hear what's going on. The Women's Bureau of the U.S. Department of Labor reports that the ladies are invading virtually every type of higher-level job, even those considered sacred male preserves. There are more women bank officials than ever, more personnel and office managers, more sales executives and more department-store supervisors. Women are now production managers in heavy industries, officials in chemical laboratories and even foremen of construction gangs.

That's not all. The National Association of Manufacturers, the Labor Department and practically all business spokesmen agree the invasion shows no signs of abating.

The conclusion, therefore, is clear: More and more women, as well as an increasing number of men, are acquiring — or may soon acquire — lady bosses. (If this prospect dismays you, just read on!)

## How Are They Doing?

All this raises the natural and significant question: How are they doing? How are the girls getting along up there in the Executive Suite and behind those glass doors? In short, do women make good bosses or don't they?

The popular impression is frankly negative. Employment-agency heads admit they often hear the refrain: "I wouldn't work for a woman boss." Personnel chiefs report frequent requests for transfers to male executives. The Harvard Business School, following a broad survey, found "a whole body of preconceptions about women [in executive jobs] which might almost be called a mythology."

We dug into the situation. We studied mountains of reports, sounded out the women officials themselves, had long, confidential talks with *their* bosses, let their male colleagues unburden themselves and spoke to employees in shop, plant and office.

The verdict: women must work harder than men to get ahead, there is plenty of resentment against them and they generally are paid less. But in spite of all this, women bosses are doing fine, thank you.

— *Continued on page 24*

**MISS VICE-PRESIDENT: "She had to be better than average to have got the job in the first place," one masculine expert points out**

Maxwell Coplon

**LAUNCHING:** For 10 years researchers have struggled with terrific problems involved in intercontinental missile flight. Self-propelled rocket RV-A-10, shown here, is big recent step. But "ultimate weapon," ICBM, will be "ballistic"—motorless for nearly all its 5,000-mile trajectory.

# The

BY DONALD ROBINSON

*This could be the way Moscow dies.*

A flash alerts the Pentagon: "Russians Attacking NATO Nations." At once, a code signal goes to a secret launching platform near the Canadian border, and a blue-clad U.S. Air Force officer pushes a button. Instantly, an intercontinental ballistic missile — the deadliest, most destructive weapon ever conceived by man — is sizzling into the sky.

Spurting flames, the missile streaks up beyond the earth's atmosphere to the never-never land of empty space. Then, at four miles a second, 20 times the speed of sound, it hurtles toward Northwest Russia, 5,000 miles away. In just 20 minutes, it's there, smashing its hydrogen-bomb warhead into the heart of Moscow.

After that, there's nothing left of the Russian capital except bits of radioactive rubble and shreds of torn human flesh.

*This also could be the way New York dies. And every other major city in the U. S.*

It sounds like a science-fiction writer's nightmare, doesn't it? But it's frighteningly real. The United States has just such a missile under development today. So has the Soviet Union.

**QUARLES:** He says the U.S. is ahead

We expect to have our intercontinental ballistic missile in operation no later than 1965. We may have it as early as 1961, according to Secretary of Defense Charles E. Wilson.

Another authority, Secretary of the Air Force Donald A. Quarles, who is himself a distinguished scientist, says, "The ICBM is now in the blueprint stage."

So much progress has been made in this direction that the Air Force has just put out a special order to all its 958,300 men, stating, "The era of the unmanned missile is very much at hand." A bestarred general in the Pentagon phrased it more bluntly: "Push-button warfare is here."

Nothing is more hush-hush today than the research and development job our government is doing in the field of guided missiles. It is more tightly guarded than the H-bomb itself. However, I can now give, within the

*Collier's, March 16, 1956*

The U.S. and Russia are engaged in a race whose outcome may determine the course of history. The goal: development of the most frightful weapon conceived by man—a virtually unstoppable 16,000-mph intercontinental ballistic missile that can drop a hydrogen warhead on a city 5,000 miles away. At stake is not only the security of the free world, but our position as the world's leading technological and industrial power. On the next page begins the full, dramatic story of the . . .

# ICBM

By HANSON W. BALDWIN

MAXWELL FREDERIC COPLAN

As Military Editor of The New York Times, the author is one of America's best known and most respected military analysts. A 1924 graduate of the U.S. Naval Academy at Annapolis, he spent three years in the Navy aboard battleships and destroyers. In 1928 he joined the staff of the Baltimore Sun (of which his father, the late Oliver P. Baldwin, was managing editor) and a year later shifted to The New York Times. He became military and naval correspondent of The Times in 1937 and Military Editor in 1942, the same year he won a Pulitzer prize for his articles on the South Pacific war. Since World War II, he has toured Europe and Asia, witnessed three atom-bomb tests, covered peacetime maneuvers, and lectured at the National War College, Naval War College, Armed Forces Staff College, Air War College, and Command and General Staff College.

# ICBM

## Is the ICBM the ultimate weapon?

## How destructive is it?

## Is there any defense against it?

## What will happen if Russia gets it first?

IT WILL not be long. In ten years—five years, perhaps only two or three—the historic count-down will start: "Ten—nine—eight—seven—six—five—four—three—two—one—" At zero a new era will open up on the earth—the era of push-button war. A giant rocket, 100 to 135 feet high, will lift slowly from its launching pad and, with voice of thunder, tongue of flame, disappear into the stratosphere. Some 20 to 30 minutes later and 5,000 miles away, the world's first intercontinental ballistic missile will plunge toward the earth.

Where will it come from?

It *could* be launched from Cape Canaveral, Florida, at the U.S. Air Force Missile Test Center, to splash harmlessly into the South Atlantic near Ascension Island. . . .

Or, the missile might be launched from a Russian desert to arch—in unseen ellipse—high above the uninhabited tundra of the north. . . .

It will make a difference—at most, the difference between peace and war; at least, the difference between added security for the West and possible Communist domination of more of the world.

Dubbed ICBM in our research laboratories and Pentagon offices, the intercontinental ballistic missile has been called "the ultimate weapon." This giant ocean-spanning, mountain-leaping rocket—mated to a hydrogen warhead with a destructive capability of megatons (millions of tons of TNT)—is a supreme instrument of offense. It arches so high (600 to 800 miles above the earth), and moves so fast (12,000 to 16,000 miles an hour) that, once it has been launched, defense against it will be nearly, if not entirely, impossible. The German V-2, the small 200-mile range forerunner of the ICBM, bombarded London during World War II, and even the conventional explosives then used in the warhead caused thousands of casualties and blew whole buildings apart. The ICBM will—when developed—threaten every city on earth, not merely with damage but with destruction.

The implications are frightening—and sobering. In the early period of the coming ICBM era, before radar missile-detection and possible antimissile defenses are developed, an enemy could probably devastate the United States with a surprise ballistic missile bombardment before we could even detect the attack—much less before we could launch a retaliatory attack. One or two missiles for each of our 50 biggest cities might cause 10,000,000 to 50,000,000 casualties, knock out perhaps a third of our industrial capacity, and turn parts of America into radioactive deserts.

But if we beat Russia in the race to develop the first practical ICBM, the weapon could be still another deterrent to nuclear war and to overt, large-scale armed aggression of any sort. Our capability of retaliation against aggressors would be considerably increased; the aggressors would have certain knowledge that they might have to pay a very high price indeed.

How is the race going?

No one—in Washington or Moscow—can answer that positively. "We just don't know," a high U.S. official says.

But many of our Intelligence officials and some of our scientists believe Russia leads today. The Communists are *not* ahead of us across the whole broad band of the missile spectrum. We don't think Russia has anything to equal our Nike or Terrier antiaircraft guided missiles, or the Army's short-range surface-to-surface bombardment missile, the Corporal. We are "fat" with other good missiles—air-to-air and ship-to-shore.

But in the field of long-range bombardment missiles—in which the ICBM is the ultimate objective—the Russians seem to be off to a head start. There is unmistakable evidence that last year they tested an intermediate-range ballistic missile—a bombardment missile of unknown accuracy but with a range of at least 800 miles, far greater than that of anything we have yet fired; a missile which is clearly a first cousin to the ICBM. Moreover, Senator Henry M. Jackson, chairman of the Military Applications Subcommittee of the Joint Congressional Committee on Atomic Energy, warned in the Senate last month that "there is a danger" the Soviets may fire a 1,500-mile ballistic missile before the end of this year. Possession of even these two intermediate weapons would give Russia the means to bombard from her own territory most, if not all, of our allies in Europe and Asia—the means perhaps to blackmail them into throwing in their lot with the Soviet bloc, denying us their bases and isolating the United States.

The truth is that the Russians have emphasized the finished "hardware," and they are getting it. We have emphasized research and "refinements," and ultimately this approach may pay off. However, our policy has been questioned within the administration itself; last month Trevor Gardner, who has urged a bigger, faster missile program, resigned his post as Assistant Secretary of the Air Force for Research and Development as the culmination of his long disagreement with the Pentagon on that subject.

Policy disputes aside, there is little doubt that time is important. We are coming into the homestretch of the race. In a year or so—perhaps less—the first earth satellites will be launched into outer space, and Russia may put hers upstairs first. The earth-satellite program, despite the general scientific knowledge it will produce for all, is really a dress rehearsal for the ICBM so far as the launching phase of the program goes. It will supply, too, some data—much needed for calculating accurate ballistic trajectories—about nature's unknowns in space. So the heat is on.

Last month Defense Secretary Charles E. Wilson took cognizance of the need for speeding up our efforts by announcing that he shortly would name a special assistant to direct all our various ballistic-missile projects.

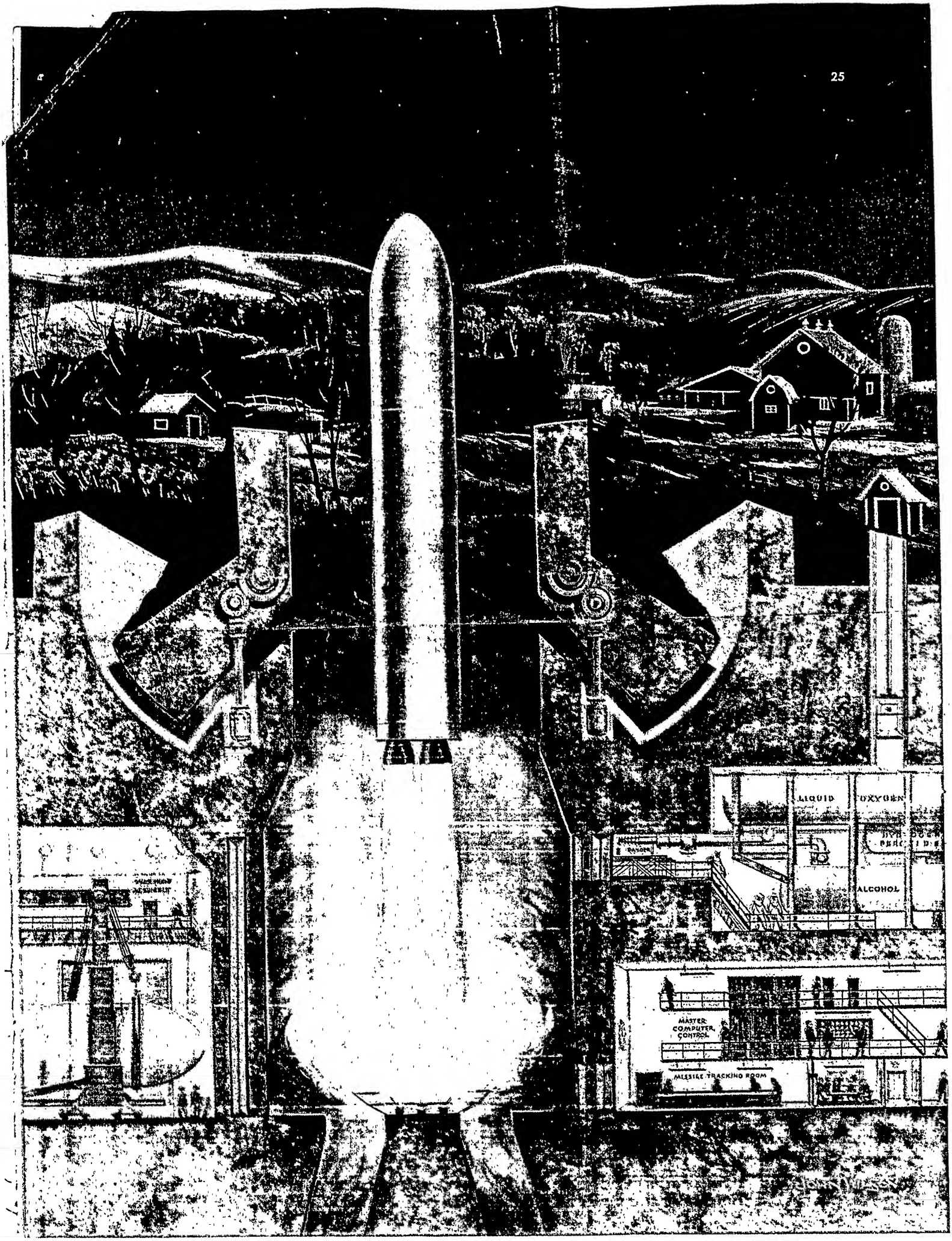
"We have always been under pressure," a missile scientist working on the ICBM says—"only more so now. We cannot afford to believe in a twenty-year peace; we have to pace our development as if war were just around the corner."

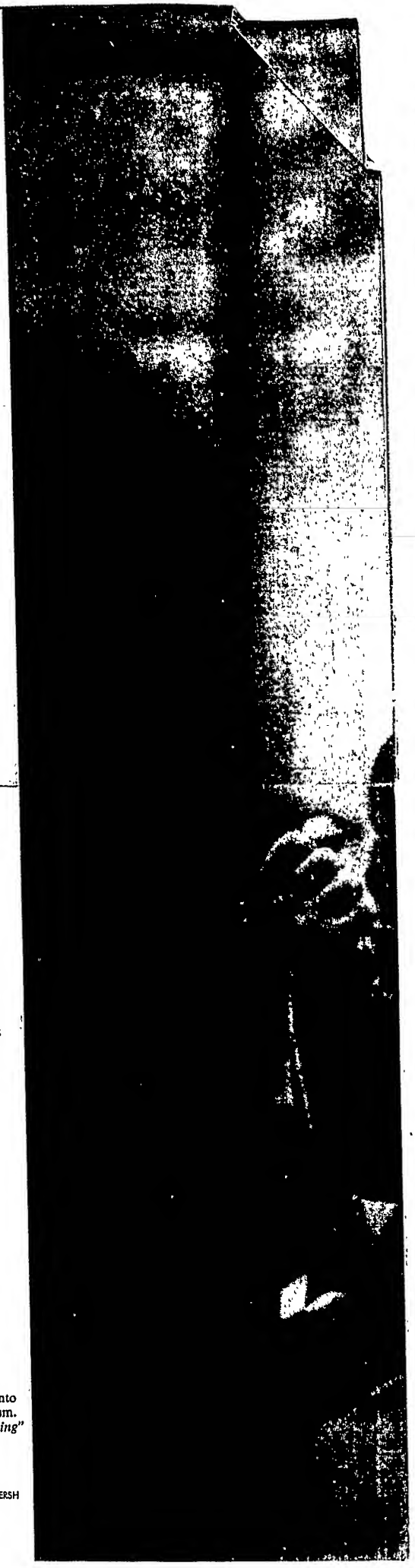
We must learn, then, whether we like it or not, to live with the ICBM, and hence we must understand not only what makes it tick and how it fits into our military armory, but what effect its development will have upon war and peace, strategy and society.

Let's suppose, for a moment, that the worst happens and Moscow does win the race for the most powerful offensive weapon known to man. The Soviet advantage would be temporary—and brief. No matter who wins the race, the other power will not be far behind—six months, one year . . . three years. Moscow, then, would have a transitory advantage in offensive delivery capabilities, a temporary monopoly of long-range ballistic weapons. But this could not be an "absolute" advantage; the ICBM won't cancel out all other offensive and all defensive systems, both active and passive. It won't mean world domination for the Kremlin—unless Russia also develops a virtually airtight defense against all other nuclear-explosive delivery systems, well-nigh an impossibility.

But Russia with an ICBM would be like a bully (*Continued on page* 74)

Artist's conception of how the ICBM may be fired: reinforced launching pit is camouflaged on surface to resemble a farm. To right of main pit are fueling room and control center; at left, the assembly room where hydrogen warhead is stored. Final shape of missile and number of stages it will have are secret; this concept contains two propulsion units and warhead


LIQUID OXYGEN
ALCOHOL
MASTER COMPUTER CONTROL
MISSILE TRACKING ROOM



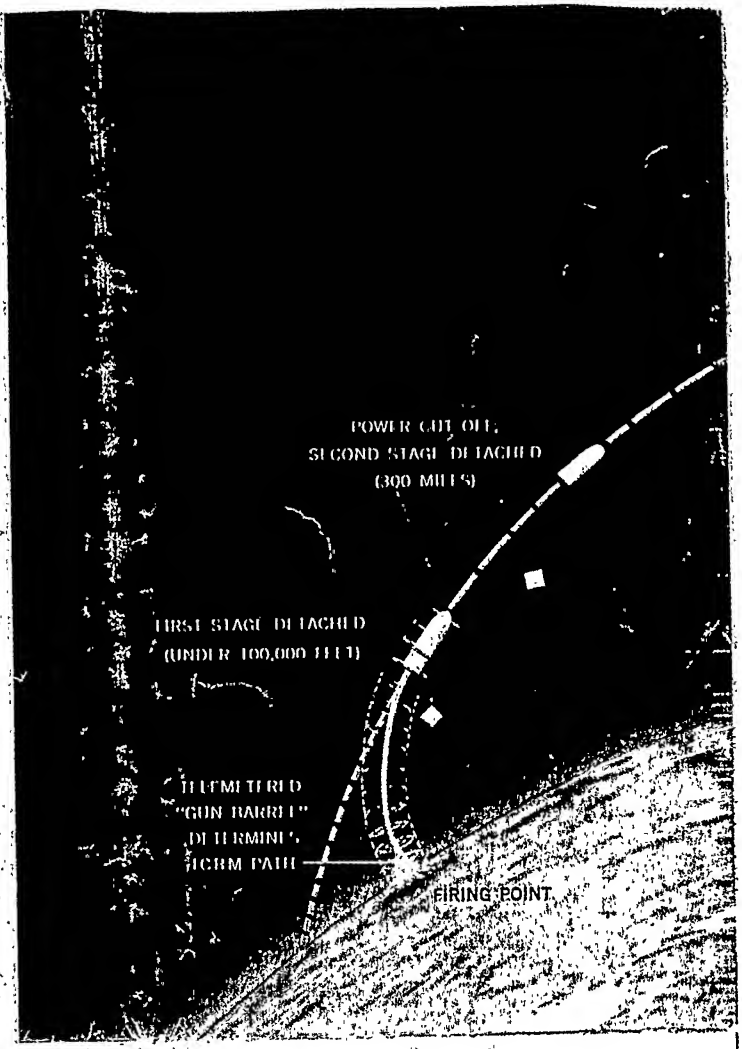
In class at Actors' Studio, Margaret Feury illustrates for fellow students a technique of projecting emotion on stage. Miss Feury has occasional stage and TV jobs, is considered one of the most promising actresses in the studio

Director Lee Strasberg oversees all studio classes, prods his students into intensely realistic performances with sharp, severe, illuminating criticism. "Acting is no mere imitation of life," he told them recently, "it is *living*"

PHOTOGRAPHED BY ED FEINGERSH

# ICBM

*continued from page 24*




The trajectory of the ICBM: it reaches twice as high into space as proposed man-made satellite, and about six times higher than the V-2. It's called a ballistic missile because it is thrown into the air by its rocket motors, then continues in free flight like an artillery shell. Word "ballistic" comes from ballista, crossbow-type artillery used by ancient Romans to hurl stones

with a really big stick. Regardless of whether he used it, he would have the means to throw his weight around dangerously—and the other boys in the block might go out of their way to avoid offending him.

To the present Communist advantage of superior land power, then, the ICBM would add a temporary—though definite—qualitative superiority in the air offensive.

I don't agree with those prophets of doom who hold that a Russian monopoly of the ICBM—even though short-lived—would enable Moscow to accomplish her objective of absolute world power. It is true, and it is a frightening thought, that if Russia wins the ICBM race, some of the tough men in the Kremlin might (figuratively) push a button and destroy New York. But Moscow has the capability of destroying New York today—though with far more difficult and less certain methods. And Russia could not hope to escape heavy retaliatory damage, whether or not we had developed the ICBM, for the intercontinental ballistic missile will not automatically replace all other ground, ship and air-based weapons. Short- and intermediate-range missiles and piloted planes, some of them firing air-to-ground missiles like the Rascal, would still pack a powerful offensive punch. Some of these would get through, no matter how good the Russian defenses.

WHAT MIGHT HAPPEN if Russia wins the ICBM race is suggested by the events that followed her conquest of the atom, when she broke our atomic monopoly. Her diplomacy became bolder; the Reds were more willing to take a chance. They started a war in Korea, got tough in Indochina and off Formosa. Right now, they are getting tough in the Middle East.

In other words, the Soviet political and psychological offensive would be greatly strengthened. Many of the world's peoples are band-wagon jumpers; they want to be on the side they think will win. We can depend on Soviet propaganda to exploit to the full a Soviet victory in the ICBM race. The Russians would be certain to hammer on the theme that the Soviet Union had displaced the United States as the most advanced industrial and technological nation in the world. The resultant loss of face for the U.S. could be damaging for the cause of freedom.

Furthermore, just as Soviet diplomacy would be strengthened by the new weapon, so ours—if we didn't have it—would be correspondingly weakened. Without the power of full retaliation, it would take a bold President and a bold Secretary of State to stand completely firm against Communist aggression and Soviet demands if our military leaders advised them that Moscow could destroy 20 major U.S. cities and pulverize our industrial plant in half an hour!

So, in my opinion, while a Russian victory in the ICBM race wouldn't mean all-out nuclear war or Communist world domination, it *would* mean a very critical period, indeed, in which U.S. diplomacy—already behind the eight ball in many parts of the world—would be still further handicapped. The danger would be that during this period Russia might make very large political-economic-psychological gains which would prejudice our future global position. The danger would be that Russia might press her campaign for the world to a point where another small war—like Korea or Indochina—might start, with unknown ultimate consequences.

What is the story behind the development of this amazing missile which can change the course of history?

The arms race today and tomorrow is centered around carriers of nuclear weapons rather than the weapons themselves. The world already has a whole "family" of A-weapons; it has about maximized weapons of destruction. The race now goes to the side that first develops the most efficient carriers for nuclear weapons: planes, ships, submarines—and missiles.

If any one man deserves the title of "Father of the Ballistic Missile," he

JOHN BRYSON

The men behind the ICBM: top, physicists Simon Ramo (left) and Dean Wooldridge, advisers and technical directors for the Air Force program; bottom, Convair's team includes (from left) Thomas G. Lanphier, Jr., vice-president and management's top man on so-called "Atlas" project; Karel Jan (Charlie) Bossart, project engineer; and James R. Dempsey, director of missile project

"Do-It-Yourself Decorators" by Pruett Carter. *Number 118 in the Series "Home Life in America"*

*When the neighbors drop over—*

# What makes a glass of beer taste so good?

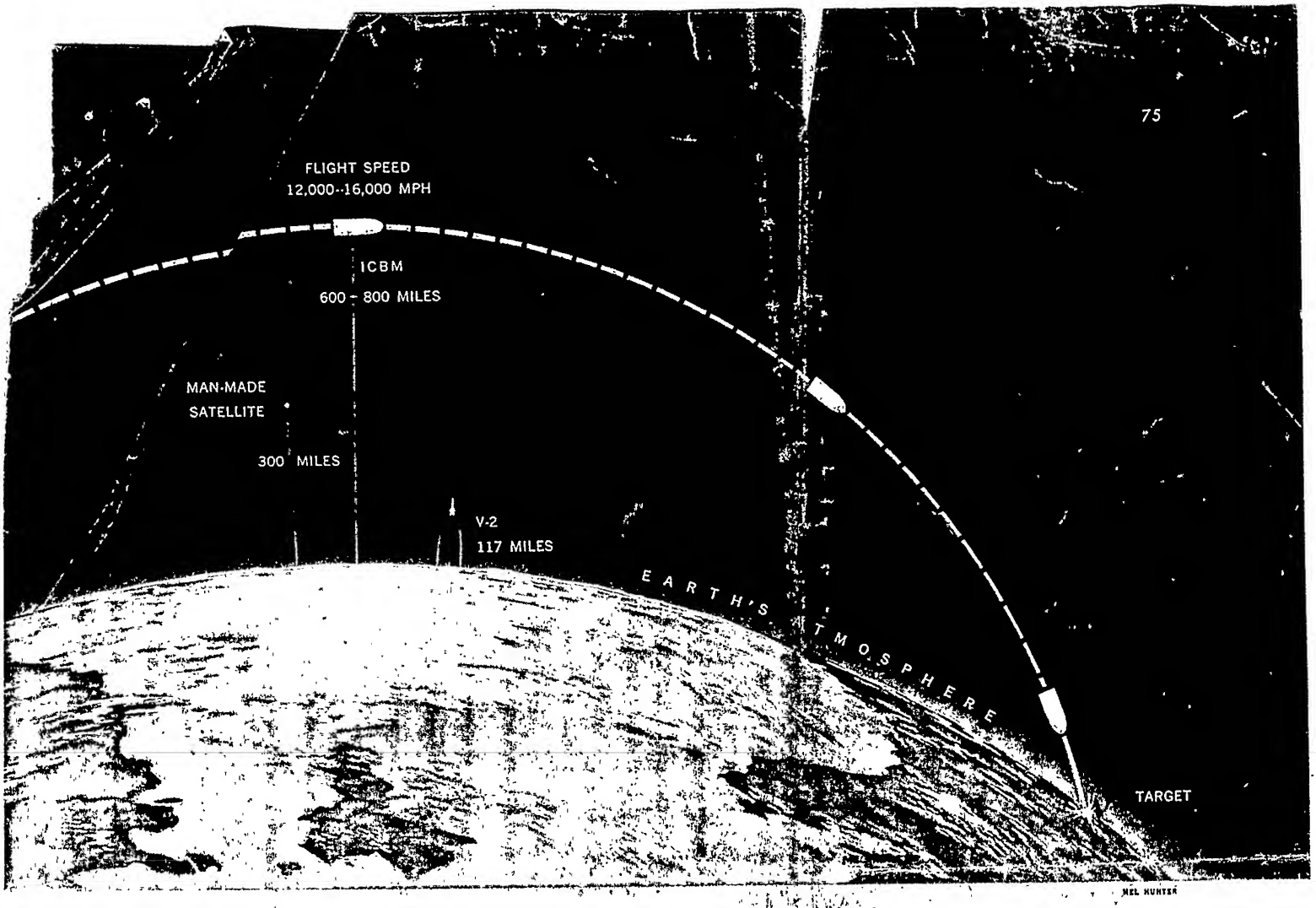
Almost overnight we've become a nation of carpenters, decorators, painters. Showing off the latest family "project" to friends and neighbors has become a familiar part of family life—just as typical and "right" as the mellow glass of beer or ale served when guests arrive.

Traditionally, beer blends right in with our friendly, informal pattern of leisure living. Because of its tangy, distinctive taste—a product of our country's finest malt barley, brewed with flavorful hops—beer is our national "beverage of moderation"... served and enjoyed in most American homes.

*Beer Belongs—Enjoy It!*

AMERICA'S BEVERAGE OF MODERATION

United States Brewers Foundation




is Dr. Wernher von Braun, a dynamic young German-born scientist. During World War II, he headed the German scientific team at Peenemünde which developed the granddaddy of the ICBM—the V-2 rocket, used against London. He and many of his countrymen were recruited by the U.S. Army after the war and brought to the United States to help develop our missiles. Now American citizens, they are an important part of the Army's missile-development team at Redstone Arsenal, near Huntsville, Alabama.

To this group's pioneering research has been added a vast volume of basic and developmental work by U.S. scientists and engineers. As a result, the United States is already flying medium-range and long-range surface-to-surface bombardment missiles—all of them to date, however, operating in the earth's atmosphere and hence relatively easier to intercept than the space-flying ICBM. The U.S. Navy's Regulus, the Air Force's Matador—both of them small pilotless planes, with ranges of about 500 miles—are much improved versions of the German V-1 pilotless aircraft which bombarded London prior to the development of the V-2. Drone planes—really a form of guided missile—have flown coast to coast with their own self-contained navigation system.

The Snark—the first of this nation's intercontinental-range guided missiles—has been test-fired at Cape Canaveral on Florida's east coast, and Northrop Aircraft Company, its developer, is reported to be about to receive a production contract. The Snark is a pilotless plane, powered by a turbojet engine, and it flies at aircraft altitudes and speeds (under 50,000 feet, 500 to 600 miles an hour) for about 5,000 miles.

The Navaho, North American Aviation's contribution to the armory of intercontinental war, is still in the development stage. Powered either with a turbojet or with a ram-jet engine, it is designed to fly higher and faster (50,000 to 75,000 feet and 1,000 to 2,000 miles per hour) than the Snark.

But all these missiles are really pilotless bombers, not intercontinental artillery like the ICBM. In fact, the wingless ballistic missile differs from a conventional artillery shell only in that it has its own integral propulsion system and can be guided from the ground in at least the initial stages of its flight. The path of a long-range artillery shell is an arc looping high into the air, then curving downward toward the target. A long-range ballistic missile follows the same elliptical trajectory—but loops into outer space and covers a few thousand miles instead of a few thousand yards.

By contrast, the long-range winged missiles now in use all follow so-called "cruise" or flat trajectories. Like piloted planes, they take off from runways, ramps, catapults or other launching rigs, climb to cruising altitude and level off. They are limited in speed, altitude and trajectory by the need of their engines for the oxygen in the atmosphere and by their dependence on their stubby wings for lift. These limitations mean that missiles like the Snark and Navaho can be intercepted—by fast piloted planes or by other missiles.

The ICBM—because it follows a ballistic trajectory outside the earth's atmosphere, because it flies so high and so fast—may become the world's first unstoppable weapon. Scientists envisage, in theory, a system of automatic tracking and intercepting missiles which might in time make possible a small "kill rate." But the time between launching and impact is so short, the technical difficulties so immense, that any such defensive system is a long way off. Furthermore, even when it is developed it can never be more than fractionally effective—and that just wouldn't be good enough. Only a few ICBMs would have to get through to knock out our own principal cities—and a good part of our war-making potential.

IMAGINE TRYING to hit an artillery shell in mid-flight with another artillery shell. This is—in minuscule—the problem of intercepting an ICBM. The expensive and extensive radar, interceptor and missile-defense system we are now so hastily and painfully erecting will be of little use against the ICBM. We cannot even track a giant rocket through its entire ballistic trajectory with our present early-warning and control radar—much less intercept it. The ICBM represents, for the immediate future at least, the ultimate triumph of the offensive in war.

Russia's probable lead in the ICBM race can be traced in part to the way in which the Soviets were able to capitalize on the preliminary work done by the Germans in World War II. While Von Braun and a number of his colleagues came over to the West, the Soviets seized the Peenemünde station itself and found a number of V-2 production lines more or less intact. Recruiting those scientists who had not already fled to the West, the Reds started up the production lines again, stockpiled V-2s and, as time went on, gradually improved the range, accuracy and performance of the missiles.

On the other hand, our immediate postwar effort in missile work was

# ICBM *continued*

centered on basic research and preliminary development. We carried out a series of test-firings of V-2-type rockets and other research vehicles at the White Sands Proving Ground in New Mexico, and awarded research contracts to a number of companies and universities. Not until the Korean war started did we attempt to turn basic knowledge into finished "hardware," and even then the emphasis was more on the pilotless-plane-type missile than the ballistic kind.

Then, more than two years ago, Assistant Air Secretary Trevor Gardner "built a fire" under the ICBM. Such a missile had been under consideration ever since World War II, with Convair doing research and design studies, part of the time at its own expense. But a missile is very different from an airplane, and rather "early on"—as the British put it—Convair encountered some of the same difficulties other aircraft companies have since met in attempting to adapt to missile work. The ICBM studies, therefore, were more or less inchoate until Gardner appointed a scientific committee in 1953 to study the project and make recommendations. This committee—and another later—not only found that an ICBM was feasible, but laid the groundwork for the present high-priority organization.

THAT ORGANIZATION is centered around a specially created Western Development Division of the Air Research and Development Command, with headquarters at Los Angeles. Here, Major General Bernard A. Schriever of the Air Force, with the aid of a sizable staff and of the Ramo-Wooldridge Corporation, is directing the development of the ICBM. (Dean Wooldridge and Simon Ramo are two brilliant young physicists who did some trail-blazing work in electronics, while with Hughes Aircraft, on the Falcon air-to-air guided missile and on various Air Force fire-control systems.) An advisory committee, including Brigadier General Charles A. Lindbergh and headed by the famous scientist Dr. John von Neumann, "kibitzes" and monitors progress.

Last year, the effort was broadened to a dual and competing approach. While Convair continues to develop its "Atlas" project, the Glenn L. Martin Company is attempting a different approach to the air-frame and configuration problem in a separate program. Companies working with Convair or Martin on propulsion matters include North American, Aerojet-General division of General Tire & Rubber Company, and Reaction Motors; while General Electric, Bell Telephone Laboratories, Sperry Rand, Bendix, AVCO, AC Spark Plug Division of General Motors, and American Bosch Arma Corporation are among firms assisting in solving guidance and other problems.

The United States has also entered—belatedly—the intermediate-range ballistic missile race. The Air Force has a project of its own under way, and the Army and Navy have begun a joint high-priority program centered at Redstone Arsenal under Major General John Bruce Medaris and Dr. von Braun; their missile will be for both ground and shipboard launching.

All these competing projects will exchange technical data; a great increase in funds is to be provided in the next fiscal year, starting July 1st, and in mid-1957—the year, incidentally, in which the U.S. hopes to launch some earth satellites into the upper atmosphere—the entire project will be reviewed. After considerable hesitancy and delay, the U.S. ballistic-missiles program at last appears to be in high administrative gear.

But the technical problems are still immense, especially as they apply to the ICBM. Imagine a giant rocket—a Gargantuan version of a Fourth of July skyrocket, more than 100 feet high, weighing more than 100 tons—hurled to an altitude 600 to 800 miles above the earth into a region of no air. Then envisage, if you can, the warhead or nose of this huge gadget slanting downward through the denser atmosphere—speeding at 15,000 miles an hour toward a target a couple of thousand miles away. How can you hit anything with such a long-range weapon? How do you even get this great mass to budge from the earth?

It can be done. One expert has said, "The missile can be built with the scientific knowledge now available, but basic research will enable us to do the job better. The work ahead is chiefly engineering."

There are three primary problems (and thousands of subsidiary ones) that collectively make up the problem of the ICBM. These are propulsion, guidance, and heat or re-entry.

"It is going to take much or most of the engine development of the country to get the ICBM upstairs," a scientist predicted in outlining the propulsion problem.

The world's fastest rocket today probably loafs along at 4,000 to 5,000 feet per second. The Atlas (Convair's name for the ICBM), if it is to travel [illegible]000 miles, will have to be moving in its first stage five to six times as fast—20 to 25 times the speed of sound.

The engines that will give the ICBM this [illegible]ph" are rocket engines; they spew hot gases out of an exhaust in the tail and the reaction lifts the rocket. They differ from other jet engines in that they run on chemicals and carry their own oxygen with them to permit combustion. The fuels can be either liquid or solid. The V-2 used a combination of alcohol and liquid oxygen; the Army's Corporal guided missile—a battlefield weapon with a range of under 100 miles—uses an acid-aniline combination.

Liquid fuels—chemicals in all sorts of combinations—produce a higher impulse, a greater thrust, than solid fuels, and they can be more easily "cut off" (combustion stopped) at a desired point in flight. But they are volatile, explosive and hard to handle, and the rocket engines that use them require a lot of "plumbing" in the form of piping. Solid propellants—really powder in various forms—haven't yet equaled the "kick" of the liquid fuels, and cutoff control is more difficult. But they are simple, reliable, rugged and give promise of providing a somewhat slower but more even acceleration.

Another potential fuel of great promise for the future (but unlikely for the first models of the ICBM) is fissionable material. A very small nuclear pile to heat and expand some type of gas might ultimately prove to be the most efficient type of propulsion for an ICBM.

But the ICBM's first rocket engines are likely to be powered with liquid fuels, or perhaps with liquids and solid propellants in combination.

A single rocket motor big enough to lift a hydrogen warhead sufficiently high for a 5,000-mile range has not yet been built. On the other hand, engines now under development could be used in multiple to provide the total thrust needed. The earth-satellite program (which really serves—in its launching phase—as a sort of "dry run" for the ICBM) will depend upon a multistage rocket for launching. Two liquid-fuel rocket engines will be connected in tandem. The first "stage" will lift the entire device rapidly into the skies; when its fuel is exhausted, a servomechanism will detach it from the main body, and the second "stage" will take over. Finally, at the apogee (top) of the trajectory, some 200 or 300 miles above the earth, a solid-propellant engine will tilt the satellite on its side and give it a final "kick" up to 30,000 feet per second in a path parallel to the earth's orbit. Thus, the earth-satellite launching program will probably involve what is called a "three-stage" rocket—three rocket engines connected in tandem, one behind another—the power of all of them used successively to get the satellite to the required speed and altitude.

The advantage of the staged rocket for the ICBM is obvious; speed increases as bulk and weight decrease, until finally the warhead—on its own and with all its propulsion mechanism dropped behind it—follows a ballistic trajectory, like an artillery shell, to its target.

ROCKET MOTORS thus can be linked in tandem, or stages, to provide the boost needed to put the warhead upstairs. Each stage would function successively; as each used its fuel and was detached the rocket would become lighter and lighter and its speed greater and greater.

But rocket motors can also be linked in parallel—or radially, like the cylinders of a radial gasoline engine. This so-called "honeycomb mesh," or "six-shooter-revolver" configuration, could also be arranged so that one or more of the engines would be detached from the central cylinder and would drop off when it had done its job.

No one yet knows which configuration—tandem or parallel motors—offers more promise; both can and probably will be used. But the ultimate ICBM will almost certainly be—as experts see it now—a staged rocket, perhaps one and a half or two propelling stages with the warhead on top.

That brings us to the second major problem—guidance. Like the jabberwockian talk of Alice in Wonderland, there have been a lot of semantics used to define *guided* missiles. One might ask: When is a guided missile not a guided missile? The answer would be: the ICBM. It will be guided only for about the first 300 miles of its 5,000-mile flight.

Imagine a gun barrel about 300 miles long. This represents the "guided" part of the ICBM's trajectory—the burning time when the rocket motors are functioning and accelerating the warhead for its 4,700 miles of free flight. Up until the last rocket-motor stage falls off, some control, some guidance is possible; after that, no human effort is likely to modify the ICBM's trajectory.

The "guidance" of the ICBM simply endeavors to put the warhead on a proper course at a proper speed at a fixed predetermined point in space. This is done primarily in two ways. The course and speed required to reach a fixed and known target are precalculated (as they are prior to the firing of an artillery shell), the amount of

For Collier's own appraisal of the importance of the Soviet-U.S. race to develop the ICBM, please turn to Comment, page 98 of this issue

# ICBM *continued*

Left: Maj. Gen. Bernard A. Schriever heads the AF ballistic missile program. Right: Trevor Gardner, dissatisfied with Pentagon policy on ICBM, resigned as Assistant Air Secretary

fuel and acceleration needed is determined, and the servomechanisms which will automatically cut off the fuel supply at the right point are adjusted before firing. Similarly, control mechanisms which will tilt the rocket toward the correct great-circle course can be preadjusted. These mechanisms can take two forms. The German V-2 rocket used graphite control vanes which were set in the blast of the jet stream; the angle at which these vanes were set deflected the jet blast and tilted the rocket. The U.S. Viking rocket, on the other hand, changed the angle of the jet blast by tilting the entire rocket motor.

IN ADDITION to careful prefiring calculations and adjustments (called "programed guidance"), some electronic control over the rocket during its climb into the blue-black emptiness of outer space is possible. The rocket is fitted with a so-called "transponder," or radar beacon, and its course during the 300 miles of guidance is tracked by ground radar. The data recorded is fed into computing machines, which immediately determine whether or not the rocket is on its predetermined course. If it is not, a new course is calculated by the machines, the correction flashed by electronic waves to the rocket, and servomechanisms deflect the jet stream and tilt the rocket, shut off, open or regulate the fuel flow. If the rocket promises to be a "wild" one (like one of our test V-2s which went the wrong way at White Sands Proving Ground and landed across the border in Mexico), a self-destroying mechanism can be activated.

This limited guidance for the ICBM may in time be supplemented. A system of so-called inertial guidance, or automatic self-navigation, now applicable to cruise-type missiles like the Navaho, can be tailored to the propulsion stages of the rocket, and—perhaps—to the warhead to keep it in the proper flying "attitude" during its free flight. A so-called "terminal guidance system," which would take over when the missile was approaching its target and would "attract" the missile to the target by light, heat or infrared, might also have some future application to the ICBM. But the difficulties would be enormous.

The ICBM as now envisaged, therefore, is subject in free flight to the whims and vagaries of nature. And some of these are irregular and variable —one reason why the ICBM will never be a "bomb-in-a-pickle-barrel" weapon, but essentially a weapon of limited accuracy for area bombardment.

There are three groups of errors which affect the guidance of an ICBM, and none of them is easily susceptible to correction.

The first of these categories might be called "errors due to nature." There is a constant and unpredictable fluctuation in the thickness of the ionospheric layers of the atmosphere which influences the propagation of radio waves through space, and hence the accuracy of any electronic guidance systems. There is, moreover, no way to predict variable changes in the direction and strength of gravitational forces, which could tend to pull an ICBM off course. And, finally, the earth's rotation—long considered a constant—has been found to change unpredictably and without uniformity; such a change could cause a missile properly launched to score a clean miss.

The second category of errors are instrument errors. These are more susceptible to human control, but will probably never be eliminated completely. Tiny errors at launching—and during the 300-mile gun-tube guidance phase—are multiplied geometrically by the long range to enormous errors on impact. An error in speed of one foot per second at the time of combustion cutoff could cause an error of one mile on impact.

The third category of errors are errors of mapping and surveying. To put it baldly, we don't know where true north is, or where, say, Sverdlovsk is. The ICBM follows a great-circle course from launching point to target. If it is to hit we have to know exactly where—on the earth's surface—the two points are. This is not as simple as it sounds; one of the great problems of missile warfare is the incorrect co-ordinates of many of the cities and points

# *More people rent cars from* HERTZ *than from any other car rental service*

*because no other car rental service offers so much for so little... and the assurance of a sparkling, new Ford Fordomatic or other fine car*

# ICBM *continued*

on earth, particularly those in Russia. Many of the world's maps are in error, especially those that show the vast area of the Soviet Union east of the Urals.

If the co-ordinates given on your maps and charts are in error you will miss. This may be one reason, incidentally, why the Russians are hostile to President Eisenhower's mutual aerial inspection proposal. They know we don't know the exact location of cities and industries east of the Urals, and they know there is probably no good way for us to find out except by a great remapping job.

All these categories of errors—many of which appear unpredictable—mean that the ICBM will have to compensate for its inaccuracy by the frightful power and the extensive destructive effect of the explosive it carries—the hydrogen warhead. Just how "inaccurate" it will be no one now knows; the first ICBM obviously will be far less accurate than later models. An error of one per cent in 5,000 miles—a figure once discussed—could mean that the missile might fall 50 miles from the target. That, scientists and military men agree, is not good enough. Scientists seem to believe that ultimately they may be able to reduce the circular error at 5,000 miles' range to five to 10 miles—provided the target is where it is supposed to be.

Dwarfing the tremendous—though soluble—problems of propulsion and guidance, virtually all scientists agree, is the problem of heat generated by skin friction when the missile re-enters the earth's atmosphere. Meteors that constantly bombard the earth nearly all burn up and disintegrate long before they reach the surface; the tremendous heat generated by their passage through the earth's atmosphere destroys them. The ICBM will be, in effect, a meteor; it will be hurled into upper space, and then fall back at high speeds into the denser lower atmosphere. The denser lower air will slow it up—perhaps down to Mach 2 or 3—but also it will heat and perhaps burn it up. In fact, the skin friction caused by the passage through the atmosphere will be so enormous that until some way is found of absorbing, or draining off, or neutralizing this heat, no intact ICBM will reach the earth.

This is a problem for metallurgists, chemists, physicists and half a dozen other specialists with long names—like aerothermodynamicist. It is a giant problem—in fact, the major problem of the ICBM today. Re-entry temperatures might, for example, reach 6,000 degrees or more, and today most of our low-carbon alloy steels lose their strength at about 1,000 degrees.

THERE ARE several approaches to this problem—and they are all being tried. You can try to slow the missile up—with wings or spoilers or some similar devices—and thus reduce the temperatures. You can plunge right on through, reducing the duration of heating, though increasing the temperature. You can try ceramic "skins," or porous or sweating jackets, which exude moisture for liquid cooling. You can devise higher-temperature alloys. Or you can take a leaf from the lesson of the larger meteorites that sometimes reach the earth; you can increase the thickness of your missile's skin (and hence the bulk and weight) and provide a "heat sink." This is the so-called "brute force" or boiler-plate approach; it obviously takes longer for a thick metal skin to melt than a thin one. But the "brute-force" approach has its disadvantages; it increases the weight of the missile and thus greatly increases the problem of the propulsion engineer.

Today, there is no clear-cut answer in sight to the heat problem—though one will be found. But again, as in the guidance problem, the power of the weapon that the ICBM will carry—the thermonuclear explosive—reduces somewhat the importance of the re-entry factor. You don't have to design a missile that will remain intact all the way to earth. It can "miss" vertically as well as horizontally and still do tremendous damage.

Here, then, is what some military men have called "the ultimate weapon," "the absolute weapon"—"the weapon that will rule the earth." It will tower perhaps 100 to 135 feet above its launching pad. Its gross take-off weight—with fuel—may be between 100 and 120 tons. It will lift, slowly at first, virtually straight into the air, burning thousands of pounds of fuel in 60 seconds. It will slowly tilt toward its great-circle course. Probably under 100,000 feet its first stage will break away; the second stage will ignite and the smaller rocket will continue its climb toward the stars. At 300 miles—above the earth's thin envelope of air—the second stage will be detached and the great warhead, perhaps 30 feet long, four feet in diameter, will streak on alone toward outer space under the tremendous momentum given it. It will reach its apogee between 600 and 800 miles above the earth and will then start its elliptical fall—perhaps tail first (for there is no bite of thin air to straighten it out). It may "tumble," particularly as it gathers speed and reaches the upper atmosphere; it should nose down under the resistance of thicker air—but erratic gyrations are possible. Finally, glowing white and slowed down to Mach 2 or 3, it will burst like a violent meteor above some unsuspecting metropolis of man.

The ICBM will be an awesome weapon—with frightening capabilities. It is well named Atlas; truly it carries man and his future on its shoulders.

THE END


*For a delightful red table wine, serve ROMA California Burgundy with your spring lamb.*

# Mealtime, Party time, any time — more fun with ROMA WINES

You're in for some real deep-down pleasure when you take home ROMA Wine, enjoy its fine flavor . . . see how *everyone* enjoys it! Serve one of the fine ROMA table wines with springtime meals . . . rich, sweet-tasting dessert wines for after dinner and snack-time . . . gay sparkling wines for celebrating! There's a ROMA Wine for every happy hour—and they're all so inexpensive for so much enjoyment and such fine quality . . . for wine with the perfect taste of ROMA!


*SHERRY AND PORT . . .*
*"right as ROMA" for informal entertaining. Buy ROMA California Sherry, smooth and delicate, especially good before dinner. And ROMA California Port, rich and ruby-red, for after dinner and whenever friends drop in.*

FINE **ROMA** WINES

Roma Wine Co., Fresno, California

*Collier's Comment*

# ICBM

## There can be too much secrecy

WHILE WE and the Soviet leaders have moved from one postwar conference to another, each of us has been building up his supply of weapons and perfecting new ones, in case of war. On the basis of recent assertions in Washington by responsible political leaders, and on the evidence adduced by Hanson W. Baldwin in this issue of Collier's, it has become at last abundantly clear that we and the Soviets are involved in a critical contest to develop the first intercontinental ballistic missile, otherwise known as the ICBM. This is not a "guided" missile in the sense that its automatic guidance apparatus carries it through its flight until the moment it finds and strikes its target. Although some form of "terminal" controls ultimately may be included in the weapon, although it is subject to guidance and correction during its first several hundred miles of flight, it is for most of the great arc of its trajectory very like a bullet. While, as pointed out by Mr. Baldwin, severe engineering problems still exist, the ICBM ultimately will be able to take off, achieve a velocity many times the speed of sound, and descend perhaps half an hour later on its target 5,000 miles away. There is no presently known method of stopping—or, as the military say, of interdicting—the missile once it has been launched.

Whether or not this is, indeed, "the ultimate weapon" or "the absolute weapon," as it has sometimes been described, is a matter the experts may debate. Meanwhile, no one can argue the appalling capacities of a hydrogen bomb encased in a 5,000-mile-range missile which cannot be stopped. It is dangerous nonsense to quibble over the relative power of a weapon when, at a minimum, it can bring under the threat of total devastation any city on earth.

Nor may we, in relation to our military requirements, be greatly concerned with Soviet intentions. These, as has been abundantly illustrated, are highly fluid as to tactics, rigid only as to ultimate aims. To understand Soviet political aims and the various techniques used in pursuing them is the primary concern of our State Department. It is the task of the Department of Defense to make certain that regardless of Soviet intentions our defense establishment is at all times equal to or better than Soviet armed strength. That is its mission in peacetime no less than in wartime.

Yet there is increasing evidence that in the critical field of the ICBM the Soviets may well be ahead. As Mr. Baldwin points out, no one (including, fortunately, the Russians) can be entirely certain that this is so. But other statements have not been reassuring. Senator Symington has said flatly that the Soviets are well ahead in the race. Senator Jackson of the Joint Committee on Atomic Energy also has indicated this in his speech in which he voiced the possibility that the Soviets soon may fire a 1,500-mile missile, with all that this threat implies against our present allies and our bases in Europe, Africa and Asia. Many a leader in defense, in science, in politics has expressed the same opinion—that the Soviets are ahead of us.

Assuming that this is true, we should like to raise and examine the question—why? In a nation which has achieved one technological miracle after another, which rightly prides itself upon its enormous gifts of scientific brains and technological know-how, why is it that we should fall behind a nation which we have all too often, out of smugness or vanity or plain bad judgment, underestimated?

Is it because the Soviets have concentrated their main effort on producing the weapon with the clearest decisive advantages while we have scattered our effort over a variety of weapons, all excellent but none with the essential capability required?

Is it because, through dilatoriness or indecision or mistaken preoccupation with cost, we have proceeded on the ICBM program on a "business as usual" basis, keeping the essential plants on a single-shift basis when nothing less than a round-the-clock program will suffice?

The facts are, at least, that the plants have *not* been working at or anywhere near capacity; that only now, when the race has been in progress for nearly three years, has anything resembling a crash program been set in motion. And the apparent fact is that, as a result, we have let the Soviets get off to a head start in a matter which is of life-and-death importance to all of us.

Another highly relevant fact is that the vast majority of Americans have been going about their daily lives completely unaware not only of the fact that we are trailing in the race, but even of the significance of the race itself. In plain logic, such a situation is intolerable in a democracy such as ours.

This is not to quarrel with the basic requirement of maintaining essential security on many aspects of our national defense. It is obvious that a vast amount of technical data on individual defense projects, and information related to their progress, must be protected by secrecy. We clearly cannot afford to leak to the Russians data that enable them to widen their lead in the race for the ICBM—this is accepted by all.

But neither is it possible—and the ICBM may provide the grimmest example of this—for this democracy to exist in circumstances where the people are sealed off from all inkling of the great, strategic considerations which govern their very lives. This is a cynical denial of both the competence of the American people and of the validity of the principle of self-government. More than that, it is harshly impractical, and self-defeating.

It is impractical, for one reason, because regardless of all else the people are invested with the *power* to govern, and they will govern, for better or worse, depending precisely upon the quality of information upon which their decisions are based. Every penny of money spent by the military on any project is provided by the House of Representatives, which alone has the power to initiate appropriation measures, and which, to a man, must return to the voters every two years for license to stay in office.

Ultimately any program such as that of the ICBM is inevitably based on public support, for it is only the public which can provide, out of pocket or through its existing institutions, the money, education and training, and scientific research programs to do the job.

The security of the United States is the primary, but not exclusive, concern of our elected representatives and our appointed military leaders. The great outlines of our defense policies and a broad knowledge of our relative defensive posture should be known not merely by a small group of leaders, but by all citizens. In a democracy, in a free society based on the wisdom and judgment of all its members, the final great decisions must be made by the nation as a whole.

But those final decisions can be made only when people have sufficient information to exercise thoughtful and careful judgment. The risk is great, but less great than when these decisions are made in an absence of public knowledge, when the public has been deprived access to information which will enable it to make competent decisions on the gravest matters of life and death and the survival of all we believe in.

It is not enough to know after the fact. It is necessary that the public be made aware of the great alternatives confronting it. Only thus do we, as a free people, retain ultimate custody of our lives and our freedom. Certainly neither history nor any possible future casualties will forgive those in power who feared to put into the hands of Americans the knowledge they needed to help prepare for their survival, but instead told them too little and too late.


"Watch it, Harry, you're beginning to act like yourself!"

COLLIER'S MARY GIBSON

Hoyt, a Cornell University ornithologist. Phloeo has pecked innumerable cages to sawdust and once, when Dr. Hoyt was careless, pecked him on the skull and knocked him cold. Phloeo has also lost her tail feathers, because of a dietary deficiency.

It is essential, of course, that Pfitz's young bird retain her tail feathers. Without them she would lose her value as a feathered guinea pig because, just as a man can't swing an ax without bracing his feet, a woodpecker can't peck without bracing its tail feathers. In order to preserve his bird's tail plumage Pfitz spends more time in the woods hunting ant-infested logs to bring home to the bird's six- by six- by eight-foot cage than most wives spend in the kitchen. But the natural diet he is feeding his bird seems to be producing results. When I saw the youngster her tail feathers were already over five inches long.

While they are waiting for the captive bird to mature and reveal to them the innermost secrets of her nature, Jorgensen and Pfitzenmeyer are also experimenting with some ideas of their own for frustrating the pileated woodpecker's pecking proclivities.

Their first scheme died stillborn. They learned that there was no record of woodpeckers ever having damaged a South American wallaba tree, which is about three times as hard as the domestic wood used in poles. Unfortunately, while they were happily preparing to experiment with wallaba poles, they received word that the Pileatus, down in Louisiana, was already chomping large chunks out of poles made of greenheart, another South American wood even harder than wallaba.

Jorgensen and Pfitz then decided to see if woodpeckers were color-conscious and could be repelled by a painted pole. They painted bands of red, white, green and yellow on some poles in a region where there was considerable pecking. In brilliant sunshine these poles looked to me like gigantic pieces of stick candy—and the birds seemed to find them enticing, too. The paint had hardly dried before the woodpeckers went to work on them, attacking every color except red. Their failure to attack the red sections may not be too significant, however. Pileatus, like any intelligent axman, takes things easy during the summer months. Jorgensen and Pfitzenmeyer want to see red go through an entire year untouched before they will believe the answer lies in anything as simple as painting a pole red.

They are also aiming to place wooden models of the kingbird on some poles. The kingbird is a pugnacious little eight-inch creature who has been known to vent his displeasure even on vultures and eagles, and most birds head for the hills when they see him coming. The question here is: Does Pileatus know a kingbird when he sees one and, if so, is he scared of him? "Unfortunately," Jorgensen says, "we haven't found much evidence that this pileated fool is afraid of anything."

ANOTHER PROJECT under consideration stems from an experiment conducted by Dr. H. W. Frings, of the university's department of zoology. He has recorded the fright cry of the starling, broadcast it over an amplifier in a town infested with starlings, and driven the pests from the area. Jorgensen and Pfitzenmeyer are intrigued with the idea of placing amplifiers, capable of projecting sound five miles, along a power line and letting them blare out the fright cry of the woodpecker once every hour. They'd also like to know just how to go about frightening a pileated woodpecker. And there are some people connected with the project who would like to know just how you go about placating any citizenry who might live within hearing distance of the amplifiers.

Meanwhile, as Pileatus continues to peck away, the utilities emit their own fright cry. A recent issue of Electrical World reported, in obvious anguish, "This bird has defeated every stratagem devised to date, is increasing in numbers, and broadening its hostilities . . . no pole is immune!" All because man, entering the second decade of the Age of the Atom, still can't figure out what makes a woodpecker peck. THE END